

SPECIFICATION P-151. CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This Work consists of clearing, clearing and grubbing, clearing for isolated trees, or topping trees, including disposal of materials, for all locations designated on the Plans.

Clearing consists of cutting and removal of all trees, down timber and uprooted stumps, brush, logs, hedges, and removal of debris and other loose or projecting material from the designated areas. Grubbing stumps and roots will not be required.

Clearing for isolated trees consists of the cutting and removal of isolated single trees or isolated groups of trees. Cut all the trees of this classification according to the requirements for the area being cleared, as shown on the Plans, or as directed by the Engineer. Trees are considered isolated when they are 40 feet (12 m) or more apart, with an exception for a small clump of approximately five trees or less. Clearing for isolated trees includes grubbing stumps and roots.

Clearing and grubbing consists of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, debris, and rubbish of any nature, natural obstructions or material that in the opinion of the Engineer is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

Topping consists of removal of a specified portion of the top of designated trees and disposal of removed material.

CONSTRUCTION METHODS

NOTE TO SPECIFIER:

If there are fences and other structures to be removed, include contract items as listed under Removing Miscellaneous Structures or add Special Provisions.

151-1.2 OFFSITE WORK. Do not enter on any parcel or land not owned by the Airport Sponsor to start Work, until receiving a written order from the Engineer that the land owner has been made aware of the expected date of commencement of the Work. Keep workforces informed of conditions or special considerations affecting off site Work, including, but not limited to:

- a. Disposition of timber,
- b. Wood,
- c. Salvaged or waste materials, and
- d. Site restoration requirements.

Contractors and subcontractors cannot enter into agreements with land owners to change the conditions of the Contract without written approval of the Engineer.

151-1.3 ENVIRONMENTAL CONSIDERATIONS. Manage clearing or clearing and grubbing operations to minimize possible disturbance or pollution to the natural or manmade environment. Protect water sources and drainage courses against infiltration of soil, silt, debris, ashes, fuels, chemicals or other foreign matter. Avoid unnecessary destruction of wildlife and wildlife habitat.

Comply with requirements of the Department of Natural Resources Air Pollution Control Rules, which prohibit the open burning of weeds, brush, logs, limbs, stumps, roots, lumber and debris from clearing and grubbing or from demolition in the Southeast Wisconsin Intrastate Air Quality Control Region, which includes the counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha, or in any other region where such burning may be prohibited.

Do not burn timber and debris until the Contractor has obtained a burning permit from the appropriate local authorities. Conform to the conditions of the burning permit. Control burning in a manner producing the least smoke or air pollutants. Do not create a hazard for operation of aircraft.

151-2.1 GENERAL. Areas denoted on the Plan to be cleared or cleared and grubbed will be staked by the Engineer. Complete clearing and grubbing in advance of the grading operations, according to the approved schedule.

Dispose of spoil materials, resulting from clearing or clearing and grubbing, by burning, when permitted by local laws, or by removal to approved disposal areas. When burning of material is permitted, burn it under the constant care of competent watchmen so that the surrounding

vegetation and other adjacent property will not be jeopardized. Burn according to all applicable laws, ordinances, and regulations. The location and schedule for burning on Airport property, must have the approval of the Airport Manager. Provide notice to agencies having jurisdiction before starting burning operations.

When indicated on the Plans or in the Special Provisions, spoil material or debris from open burning may be buried at approved locations on the Airport. Cover buried material with a minimum of one foot of earth and grade the surface to the previously existing elevations or to the proposed finish elevations.

Chip, burn, or bury under at least 1 foot (0.3 m) of earth elm wood consisting of trees, logs, stumps, stubs, branches or windfalls with adhering bark and all elm bark and debris encountered within clearing and grubbing limits or resulting from clearing and grubbing operations

Debar elm logs salvaged and elm wood or stumps not disposed of by chipping, burning, or burying and chip, burn, or bury the bark. For clearing and grubbing operations performed between April 1 and September 30, perform the final disposal of elm wood, bark, or debris within 30 days, except that when the material is thoroughly sprayed with No. 1 fuel oil, the time period for its disposal is extended to 50 days. For clearing and grubbing operations performed between October 1 and March 31, perform the final disposal of elm material before the succeeding May 1.

Paint promptly and completely with asphalt base tree paint all cut surfaces and abrasions sustained by healthy oak trees and saplings between April 11 and September 30 as a result of the Contractor's operations. Paint the cut surfaces of the stumps of all healthy oak trees and saplings, whether they are to remain in place or are to be grubbed.

If the Plans or the Specifications require saving merchantable timber, trim the limbs and tops from designated trees, saw them into suitable lengths, and make the material available for removal by other agencies.

Unless otherwise specifically provided in the Contract, all timber salvaged from the required clearing of designated areas and from clearing of trees acquired by and for the Sponsor in the acquisition of easements, shall become the property of the Contractor. The timber may be disposed of by the Contractor off the Airport at locations provided by the Contractor.

Private owners, holding underlying title to lands acquired or reserved for Airport purposes by easement or by use, have a prior right to all timber from trees standing or lying thereon, except timber from trees that have been acquired by the Sponsor in the acquisition of the property interests. Negotiate with property owners relative to disposal of trees cut on their land. Remove those trees or portions thereof not claimed by the owners from the property and dispose of them in a manner that will not be unsightly.

NOTE TO SPECIFIER:

When the land owner has kept rights to timber, a description of these rights should be included in the special provisions.

Blasting to remove stumps must be in accordance with all laws and regulations. Do not endanger life or property.

Unless otherwise shown on the Plans, local agencies will remove existing structures and utilities required to permit orderly progress of Work. Whenever a telephone or telegraph pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated advise the Engineer who will notify the proper local authority or owner and attempt to secure prompt action.

151-2.2 CLEARING. Clear the staked or designated areas of all objectionable materials. Cut up, remove, and dispose of trees unavoidably falling outside the specified limits. Minimize damage to trees to remain, by felling toward the center of area being cleared. Preserve and protect from injury all trees not to be removed. Cut trees, stumps, and brush to a height less than 12 inches (300 mm) above the ground. Grubbing of stumps and roots will not be required under the Pay Item for Clearing.

When isolated trees are designated for clearing, the trees will be classed in accordance with the butt diameter size as measured at a point 18 inches (450 mm) above the ground level.

Grubbing stumps and roots is required under the Pay Item for Clearing for Isolated Trees.

151-2.3 CLEARING AND GRUBBING. In areas designated to be cleared and grubbed, remove all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials, except where embankments exceeding 6 feet (1.8 m) in depth are to be constructed outside of paved areas. Grub tap roots and other projections over 1-1/2 inches (38 mm) in diameter out to a depth of at least 18 inches (450 mm) below the finished subgrade or slope elevation. In embankment areas greater than 6 feet (1.8 m) in depth, outside of paved areas, remove unsatisfactory materials; however, sound trees, stumps, and brush can be cut off within 6 inches (150 mm) above the ground and allowed to remain.

Break down sides of all holes remaining after the grubbing operation in embankment areas to flatten out the slopes, and fill them with acceptable material, moistened and properly compacted in layers to the density required in Specification P-152, Excavation and Embankment. Apply the same construction procedure to all holes remaining after grubbing in excavation areas where the depth of holes exceeds the depth of the proposed excavation.

151-2.4 TOPPING. Complete topping for trees designated on the Plans. Remove tree trunks and branches to a horizontal plane at a specified elevation or a specified distance below the top of the tree. Perform topping in accordance with accepted horticultural practices in a manner that will not damage portions of the tree intended to remain in place. Treat cut surfaces on oak trees in the manner previously specified. Dispose of removed material.

METHOD OF MEASUREMENT

151-3.1 Quantities of clearing or clearing and grubbing as shown on the Plans are the number of acres or fractions thereof, of land specifically cleared or cleared and grubbed. Areas identified and delineated on the Plans to be cleared or cleared and grubbed per lump sum will be measured as a complete unit for each area designated.

Isolated trees designated for clearing will be categorized by butt diameter, according to the schedule of sizes as follows:

- Less than 2 feet, butt diameter
- From 2 to 4 feet, butt diameter
- Greater than 4 feet, butt diameter

Topping will be measured on a unit basis for each tree designated on the Plans to be topped.

BASIS OF PAYMENT

151-4.1 CLEARING. Payment will be made at Contract price per lump sum for a designated area, or at the Contract unit price per acre for clearing. This price will be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the Work.

151-4.2 CLEARING ISOLATED TREES AND TOPPING TREES. Payment will be made at the Contract unit price per each for clearing isolated trees or for topping trees. This price will be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the Work.

151-4.3 CLEARING AND GRUBBING. Payment will be made at the Contract unit price per acre, or at the Contract lump sum price for a designated area for clearing and grubbing. This price is full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15101	Clearing, per acre
Pay Item P15102 through P15119	Clearing for Area No. ____, per lump sum
Pay Item P15120	Clearing and Grubbing, per acre
Pay Item P15121 through P15139	Clearing and Grubbing for Area No. ____, per lump sum
Pay Item P15140	Clearing for Isolated trees, less than 2 feet diameter, per each
Pay Item P15141	Clearing for Isolated trees, from 2 to 4 feet diameter, per each
Pay Item P15142	Clearing for Isolated trees, greater than 4 feet diameter, per each
Pay Item P15150	Topping Trees, per each

Measurement and Payment will only be made for Pay Items listed in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

NOTES TO SPECIFIER:

1. **P15101 – Clearing.** Use this item in areas where grubbing is not possible (e.g., marshes), necessary (e.g., in embankment areas where fill height exceeds 6 feet), or cost effective (e.g., large areas outside of safety areas, OFZ, etc., when budget is a consideration).
2. **P15102–P15119 – Clearing for Area No. _____.** Use when a lump sum is desirable. Show areas on plan.
3. **P15121–P15139 – Clearing and Grubbing for Area No. _____.** Use when a lump sum bid is desirable. Show area on plan. Can be used for fence lines containing groups of trees, stones and debris (fence removal is a separate item).
4. **P15150 & P15151 – Topping.** When the Pay Item Topping Trees is used, it is anticipated that the location, type of tree, height of topping required, and elevation above which topping is required will be shown on the Plans. If bidding topping per each is not appropriate, a Special Provision should be written to address any special situations. For topping over 20 feet or special cases, use P15155–P15179. Put a topping schedule with individual topping heights and locations on plan.
5. **P15155–P15179 – Topping tree No. _____.** Show location, tree number and height to top on plans.

SPECIFICATION P–152. EXCAVATION AND EMBANKMENT

DESCRIPTION

152–1.1 This Work covers excavation, disposal, placement, and compaction of all materials within the limits shown on the Plans required to construct runway safety areas, runways, taxiways, aprons, drainage facilities, building sites, access roads, parking facilities, or other purposes in accordance with these Specifications and in conformity to the dimensions and typical sections shown on the Plans.

NOTE TO SPECIFIER:

Special Provisions will usually be required to change the percent of maximum density and depth of compaction in 152–2.2(f) and 152–2.6 and the ASTM method for determining maximum density in 152–2.11.

The Specifier should note that the Standard Specifications are written to pay for salvaged topsoil in the same manner as WisDOT Highways. The Specifier should check to determine if a portions of the quantity of EBS will need to be added to the excavations quantity, or if EBSit will be entirely removed to provide under the Salvaged Topsoil Pay Item.

152–1.2 CLASSIFICATION. All material excavated will be classified as defined below:

- a. **Unclassified Excavation.** Unclassified Excavation consists of the excavation and placement of all material, regardless of its nature.

b. Rock Excavation. Rock Excavation includes all solid rock in ledges, in bedded deposits, in unstratified masses, and conglomerate deposits that are so firmly cemented they cannot be removed without blasting or using rippers. Boulders containing a volume of more than 1 cubic yard (0.8 cubic meter) will be classified as Rock Excavation.

c. Common Excavation. Common Excavation consists of the excavation and placement of all material, regardless of its nature, except Rock Excavation as defined herein.

d. Marsh Excavation. Marsh Excavation, when required, will be measured and paid as Unclassified Excavation or as Common Excavation, unless a Pay Item for Marsh Excavation is included in the Schedule of Prices, in which case it will be measured separately and paid as Marsh Excavation. Marsh Excavation consists of excavation below the original ground level of marshes and swamps underlying proposed embankments, located within the limits indicated on the Plans. Material of whatever nature encountered below the original ground elevations within areas designated on the Plans will be classified as Marsh Excavation.

e. Borrow Excavation. Borrow Excavation, when required, will be measured and paid as Unclassified Excavation or as Common Excavation, unless a Pay Item for Borrow Excavation is included in the Schedule of Prices, in which case it will be measured separately and paid as Borrow Excavation. Borrow Excavation consists of approved material required for the construction of embankment or for other portions of the Work in excess of the quantity of usable material available from required excavations. Obtain borrow material from areas within the limits of the Airport property but outside the normal limits of necessary grading, or from areas outside the Airport.

NOTE TO SPECIFIER:

All material excavated shall be considered "unclassified" unless the Engineer includes other classifications in the Schedule of Prices. If rock excavation is a Pay Item, include Common Excavation instead of Unclassified Excavation.

152-1.3 UNSUITABLE EXCAVATED MATERIAL. Consider material containing vegetable or organic matter, such as muck, peat, organic silt, or sod as unsuitable for use in embankment construction that will support pavement. Material, when approved by the Engineer as suitable to support vegetation, may be used on the embankment slope.

152-1.4 SUBGRADE SUPPORTING PAVEMENT. Subgrade supporting pavement means the portion of the subgrade (located in excavation or embankment) located beneath the pavement that carries the loads imposed on the pavement, including the adjacent soil located within the limits of a 45 degree (measured from horizontal) angle of repose projected outward from the outside edges of the pavement. Pavement in this context includes the subbase, base, and surface course.

CONSTRUCTION METHODS

152-2.1 GENERAL. Before beginning excavation, grading, and embankment operations, clear and grub the area in accordance with Specification P-151, Clearing and Grubbing. Remove and dispose of vegetation greater than 1 foot (0.3 m) in height prior to breaking ground for excavation or placing embankments.

Suitability of material to be placed in embankments is subject to approval by the Engineer. Dispose of unsuitable excavated material at locations shown on the Plans. Grade disposal areas for excess excavated material to allow positive drainage of the area and of adjacent areas. Do not extend the surface elevation of disposal areas above the surface elevation of adjacent usable areas of the Airport, unless specified on the Plans.

NOTE TO SPECIFIER:

Disposal areas for excess excavation material should be shown on the Construction Layout Sheet or other appropriate locations on the Plans. Topsoiling, seeding, fertilizing, and mulching Pay Items should be measured for disposal areas.

When the excavating operations encounter artifacts of historical or archaeological significance, temporarily discontinue operations. At the direction of the Engineer, excavate the site in a manner as to preserve the artifacts encountered and allow for their removal. This excavation will be paid for as Extra Work.

Scarify and disc those areas outside of the pavement areas in which the top layer of soil material has become compacted, due to hauling or other construction activities, to a depth of 4 inches (100 mm), in order to loosen and pulverize the soil.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures take necessary precautions to preserve them or provide temporary services. When such facilities are encountered, notify the Engineer, who will arrange for their removal if necessary. Repair or pay the cost of all damage to these facilities or structures that may result from Contractor operations during the period of the Contract.

152-2.2 EXCAVATION. Do not start excavation until the Work has been staked. Use suitable excavated material to construct embankments, subgrade, or for other purposes shown on the Plans. Dispose of unsuitable material at locations shown on the Plans.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, use the excess to grade the areas of ultimate development or dispose of as directed. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, obtain the deficiency from borrow areas.

Maintain the grade so the surface is well drained at all times. When necessary, provide temporary drains and drainage ditches to intercept or divert surface water affecting the Work.

a. Selective Grading. When selective grading is indicated on the Plans or directed by the Engineer, use the more suitable material as designated by the Engineer in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, stockpile it in approved areas until it can be placed. Rehandling is considered part of the Work and include the cost in the Contract price.

b. Undercutting. Excavate rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for runway safety areas, subgrades, roads, shoulders, or areas intended for turbing to a minimum depth of 12 inches (300 mm), or to the depth specified on the Plans, below the finished grade. Dispose of materials at locations shown on the Plans. This excavated material will be paid for at the Contract unit price per cubic yard for Unclassified Excavation or Rock Excavation or Common Excavation. Refill the excavated area with suitable material, obtained from the grading operations or borrow areas and compact in accordance with this Specification. Refilling constitutes a part of the embankment. Where rock cuts are made and refilled with selected material, drain pockets created in the rock surface in accordance with details shown on the Plans.

c. Excavation Below Subgrade (EBS). Remove deposits of frost heave material, unstable silty soils, water bearing soils, topsoil containing detrimental quantities of humus or vegetable matter, or other undesirable foundation material from areas below the subgrade that will support pavement, as specified elsewhere, or as shown on the Plans. Slope the bottoms of excavation to drain to prevent accumulation of water and saturation of the subgrade. Dispose of excavated material in designated disposal areas. Backfill the excavation with selected fill materials suitable for embankments.

NOTE TO SPECIFIER:

The designer should estimate the quantity of EBS and add this quantity to the excavation quantities in the Schedule of Prices.

The Engineer shall specify the appropriate class of excavation in the Schedule of Prices.

The plans shall show details for draining pockets created in rock cuts.

d. Overbreak Overbreak (including slides) is that portion of material displaced or loosened beyond the finished Work as planned or authorized by the Engineer. The Engineer will determine if the displacement of such material was unavoidable and Engineer's decision is final. Grade or remove and dispose of overbreak as directed; however, payment will not be made for the removal and disposal of overbreak that the Engineer determines as avoidable. Unavoidable overbreak will be classified as Unclassified Excavation or Common Excavation.

e. Removal of Utilities. Removal of existing structures and utilities required to permit the orderly progress of Work will be accomplished by someone other than the Contractor. Excavate the remaining foundations for at least 2 feet (0.6 m) below the top of subgrade or as indicated on the Plans, dispose of the material, and backfill foundations thus excavated with suitable material compacted as specified herein.

f. Requirements. Compact the subgrade supporting pavement to the target densities (expressed as a percentage of maximum density) and lower specifications' limits (L) specified in the Special Provisions.

NOTE TO SPECIFIER:

Change in lot and subplot sizes can be made by Special Provision after coordination with WBOA and FAA. However, in general, the lot size should not exceed 5,000 square yards.

Subgrade supporting pavement within the limits of cut areas will be accepted for density on a lot basis. A lot consists of a 5,000 square yard (4,180 square meter) area. The width and length of lots will be determined by the Engineer. Each lot will be divided into 8 equal sublots. Testing and acceptance will be in accordance with 152-2.11, Acceptance and Testing for Density.

No separate payment or measurement for payment will be made for materials removed, manipulated, and replaced in order to obtain the required density within the top 9 inches (225 mm) of the subgrade. Removal, manipulation, aeration, replacement, recompaction of materials within the top 9 inches (225 mm) of subgrade to obtain required density is considered incidental to excavation and embankment operations and the costs included in the Contract prices for excavation. Subgrade compaction in areas where subgrade materials are

required to be removed, manipulated, aerated, replaced, and recompacted to a depth greater than 9 inches (225 mm) below subgrade will be measured and paid separately.

Remove stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension from the top 6 inches (150 mm) of the subgrade beneath pavement. The finished grading operations, conforming to the typical cross section, shall be completed and maintained ahead of the paving operations a distance to minimize erosion while maintaining the project schedule.

Remove loose or protruding rocks on the back slopes of cut areas to finished grade. Dress cut-and-fill slopes uniformly to the slope, cross section, and alignment shown on the Plans or as directed by the Engineer.

Blasting will be permitted only when proper precautions are taken for the safety of all persons, the Work, and property. Repair and pay for damage done to the Work or property. Operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all state and local regulations and explosive manufacturers' instructions.

Where blasting is proposed, employ a vibration consultant, approved by the Department, to advise on explosive charge weights per delay and to analyze records from seismograph recordings. The seismograph must be capable of producing a permanent record of the three components of the motion in terms of particle velocity, and be capable of internal dynamic calibration.

In each distinct blasting area, where pertinent factors affecting blast vibrations and their effects in the area remain the same, prepare a blasting plan of the initial blasts. This plan must consist of hole size, depth, spacing, burden, type of explosives, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock, and any depth of overburden. Do not increase the maximum explosive charge weights per delay included in the Plan without the approval of the Department.

Keep a record of each blast fired; blast dates, blast times, blast locations, the amount of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location.

Make available these records to the Engineer on a monthly basis or in tabulated form at other times as required.

152-2.3 BORROW EXCAVATION. Borrow area(s) within the Airport property are indicated on the Plans. Borrow excavation can be made only at these designated locations and within the horizontal and vertical limits as staked or as directed.

NOTE TO SPECIFIER:

Show borrow areas on the Plans. Quantities of salvaged topsoil, seeding, fertilizer, and mulch required to restore borrow areas shall be measured and paid separately.

When borrow sources are outside the boundaries of Airport property, locate and obtain the supply, subject to the approval of the Engineer. Notify the Engineer, at least 15 days prior to beginning the excavation, so necessary measurements and tests can be made. Dispose of all unsuitable material. Open the borrow pits to expose the vertical face of various strata of acceptable material to enable obtaining a uniform product. Excavate borrow pits to regular lines to permit accurate measurements, and drain and leave the site in a neat, presentable condition with all slopes dressed uniformly.

152-2.4 DRAINAGE EXCAVATION Drainage excavation consists of excavating for drainage ditches, intercepting ditches and other drainage ways, temporary levee, berm or siltation pond construction; and all other types of drainage facilities designed or shown on the Plans. Perform the Work in the proper sequence. Place satisfactory material in fills and unsuitable material in disposal areas. Construct intercepting ditches prior to starting adjacent excavation operations. Perform Work to secure a finish true to line, elevation, and cross section.

Maintain ditches constructed on the project to the required cross section and keep them free of debris or obstructions until the project is accepted.

152-2.5 PREPARATION OF EMBANKMENT AREA. Where an embankment is to be constructed to a height of 4 feet (1.2 m) or less, remove sod, topsoil, and vegetable matter from the area underlying the proposed embankment and within the limits of imaginary lines extending outward at one-to-one slopes from the outside edges of the lowest pavement course to the intersection with the existing ground, and break up the cleared surface by plowing or scarifying to a minimum depth of 6 inches (150 mm). Compact this area as indicated in Subsection 152-2.6.

When the height of fill is greater than 4 feet (1.2 m), remove sod, topsoil, and vegetable matter from the area underlying the proposed embankment and within the limits of imaginary lines extending outward at one-to-one slopes from the outside edges of the lowest pavement course to the intersection with the existing ground. Thoroughly disc and recompact the area to the density of the surrounding ground before constructing the embankment.

Salvage all suitable topsoil from areas beneath embankments as designated above and stockpile for use as salvaged topsoil. If salvaged topsoil is in excess of the quantities required for topsoiling, dispose of the excess in disposal areas specified or indicated on the Plans. Determine the quantities necessary to stockpile and to dispose of to avoid rehandling the material.

Where embankments are to be placed on natural slopes steeper than 3 to 1, construct horizontal benches as shown on the Plans.

NOTE TO SPECIFIER:

The Engineer shall include benching details on the plans based on the type of material, degree of consolidation of the material, and the degree of homogeneity of the material. The minimum width of the bench shall be sufficient to accommodate construction equipment.

No measurement will be taken nor direct payment made for the Work performed under this Section. Clearing and grubbing and the quantity of excavation removed will be paid for under the respective Pay Items.

152-2.6 FORMATION OF EMBANKMENTS. Form embankments in successive horizontal layers of not more than 8 inches (200 mm) loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

Conduct grading operations, and place the various soil strata to produce a soil structure as shown on the typical cross section or as directed. Do not incorporate materials such as brush, hedge, roots, stumps, grass and other organic matter in the embankment.

Suspend operations on earthwork when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory conditions of the field. Drag, blade, or slope the embankment to provide proper surface drainage.

The material in the layer must be within ± 2 percent of optimum moisture content before rolling to obtain the prescribed compaction, unless it can be demonstrated in the field that required densities can be obtained at lower moisture contents. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be required when necessary. Should the material be too wet to permit proper compaction or rolling, all work on the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Sprinkling of dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Provide equipment to furnish the required water at all times. Samples of all embankment materials for testing will be taken for acceptance and testing. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content in order to achieve the correct embankment density.

NOTE TO SPECIFIER:

Prepare a Special Provision that specifies the required target densities and lower specification limits for embankments. The target densities should conform to FAA criteria, and Table 1 and related notes found in a previous Note to Specifier under Subsection 152-2.2(f). Lower specification limits (L) shall be 4.5% less than the target densities listed in Table 1.

Continue rolling operations until the embankment (subgrade) supporting pavement is compacted to the target densities (expressed as a percent of maximum density) and the lower specification limits (L) specified in the Special Provisions.

NOTE TO SPECIFIER:

The lot size for acceptance and testing of embankment under pavement will be 4000 cubic yards. The Engineer may specify other values as appropriate to the job size. If it is necessary (because of the presence of expansive soils or other unusually sensitive soils) to apply special controls to the moisture content of the soil during or after compaction to ensure strength, the Engineer shall specify the appropriate moisture content. The moisture limitations shall be specified using acceptable moisture ranges as determined by ASTM D 698 or ASTM D 1557:

Embankment is accepted for density on a lot basis. A lot consists of 4,000 cubic yards of embankment. Each lot will be divided into 8 equal sublots. The Engineer will determine the dimensions and locations of the lots and sublots. Testing and acceptance will be in accordance with Subsection 152-2.11, Acceptance and Testing for Density.

On areas not supporting pavement, continue rolling operations until the embankment is compacted to a target density not less than 95 percent of maximum density and a lower specification limit (L) not less than 90.5 percent of maximum density, or to the requirements previously specified for embankment beneath pavement, whichever is less. Accept for density on a lot basis embankment not supporting pavement. A lot consists of 8,000 cubic yards of embankment. Each lot will be divided into 8 equal sublots. The Engineer will determine the location and dimension of lots and sublots. Testing and acceptance will be in accordance with Subsection 152-2.11, Acceptance and Testing for Density. On all areas outside of the pavement areas, no compaction is required on the top 4 inches (100 mm).

NOTE TO SPECIFIER:

For embankments that do not support pavement, the percent of maximum density can be changed by special provision to 90 percent and the lower specification limit (L) changed to not less than 85.5 percent for embankments constructed with cohesive soils. Normally only one percentage is specified for a particular site project.

Keep compaction areas separate, and do not cover a layer with another until the proper density is obtained.

During construction of the embankment, route equipment at all times, both when loaded and when empty, over the layers as they are placed and distribute the travel evenly over the entire width of the embankment. Operate equipment in a manner that will break up hardpan, cemented gravel, clay, or other chunky soil material into small particles and incorporate them with other material in the layer.

Begin embankment layer placement in the deepest portion of the fill; as placement progresses, construct layers approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, incorporate the rock into the outer portion of the embankment and incorporate the acceptable material under areas, which will support pavement. Do not place stones or fragmentary rock larger than 4 inches (100 mm) in their greatest dimensions in the top 6 inches (150 mm) of the subgrade. Place rockfill in layers as specified or as directed and exert every effort to fill the voids with the finer material to form a dense, compact mass. Do not dispose of rock or boulders outside excavation or embankment areas, except at places and in the manner designated by the Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, place such material in the embankment as directed in layers not exceeding 2 feet (600 mm) in thickness. Level and smooth each layer with suitable leveling equipment and by distribution of spalls and finer fragments of rock. Do not construct these rock fragment type lifts closer than 4 feet (1.2 m) from the finished subgrade. Density requirements do not apply to portions of embankments constructed of materials which cannot be tested in accordance with specified methods.

Do not place frozen material in the embankment nor place material upon frozen embankment.

There will be no separate measurement of payment for compacted embankment, and all costs incidental to placing in layers, compacting, discing, watering, mixing, sloping, and other necessary operations for construction of embankments will be included in the Contract price for excavation, borrow, or other items.

152-2.7 FINISHING AND PROTECTION OF SUBGRADE. After the subgrade has been substantially completed, prepare the full width of the subgrade by removing any soft or other unstable material which will not compact properly. Bring resulting low areas and other holes or depressions to grade with suitable select material. Provide a thoroughly compacted subgrade shaped to the lines and grades shown on the Plans by scarifying, blading, and rolling.

Grade the subgrade so that it will drain readily. Take precautions necessary to protect the subgrade from damage. Limit hauling over the finished subgrade to essential construction operations only.

Smooth and recompact all ruts or rough places that develop in a completed subgrade.

Do not place subbase or surface course on the subgrade until the subgrade has been approved by the Engineer.

152-2.8 HAUL. All hauling will be considered a necessary and incidental part of the Work. Consider its cost and include it in the Contract unit price for the Pay Items of Work involved. No payment will be made separately or directly for hauling.

152-2.9 TOLERANCES. In areas prepared for a subbase or base course, smooth the subgrade top to the extent that, when tested with a 16-foot (4.9 m) straightedge applied parallel and at right angles to the centerline, it does not show any deviation in excess of 1/2-inch (13 mm), or is not more than 0.05-foot (.015 m) from true grade as established by grade hubs or pins. Correct deviations in excess of these amounts by loosening, adding or removing materials, reshaping, and recompact.

Do not vary surface smoothness on runway safety areas and intermediate and other designated areas more than 0.10 foot (0.03 m) from true grade as established by grade hubs. Correct deviations in excess of this amount by loosening, adding or removing materials, and reshaping.

152-2.10 SALVAGED TOPSOIL. Salvage topsoil from stripping or other grading operations when it is specified or required as shown on the Plans or under Specification T-905. Salvaged Topsoil shall meet the requirements of Specification T-905. If, at the time of excavation or stripping, Salvaged topsoil cannot be placed in its proper and final section of finished construction, stockpile the material at approved locations. Do not place stockpiles where they will be a hazard to airport operations and do not place it on areas which will require excavation or embankment. If, in the judgment of the Engineer, it is practical to place the Salvaged Topsoil at the time of excavation or stripping, place the material in its final position without stockpiling or further handling.

NOTE TO SPECIFIER:

The Engineer shall indicate appropriate runway and taxiway clearances in accordance with AC 150/5370-2, Operational Safety on Airports During Construction, Appendix 1 on the construction operations sheet.

Upon completion of grading operations, place stockpiled Salvaged Topsoil as directed, or as required in Specification T-905.

No direct payment will be made for Salvaged Topsoil under Specification P-152, Excavation and Embankment. The quantity removed and placed directly or stockpiled will be paid for at the Contract unit price per cubic yard for Unclassified Excavation or Common Excavation.

When stockpiling of topsoil and later rehandling of such material is directed by the Engineer, the rehandled material will be paid for at the Contract unit price for Salvaged Topsoil, as provided in Specification T-905, Topsoil and Salvaged Topsoil.

152-2.11 ACCEPTANCE AND TESTING FOR DENSITY. Excavation and embankment areas are accepted for density on a lot basis. Lot size, subplot size, and number of sublots are as required in specifications for excavation and embankment areas.

One in-place field density test will be made for each subplot. Test locations will be determined by the Engineer on a random basis in accordance with statistical procedures contained in ASTM D 3665. The percent compaction of each sampling location will be determined by dividing the in place field density of each subplot by the average laboratory maximum density of the lot. The in-place field density will be determined by the Engineer in accordance with ASTM D 2922 Method B Direct Transmission. The maximum density is the maximum density of laboratory specimens prepared from samples of material taken from the site and is determined in accordance with ASTM D 1557. The nuclear gage will be calibrated in accordance with ASTM D 2922, Annex A1 and operated by a technician in accordance with the requirements of the manufacturer. The operator of the nuclear gage must show evidence of training and experience in the use of this instrument. The gage will be standardized daily in accordance with ASTM D 2922, paragraph 8. Use of ASTM D 2922 results in a wet unit weight and when using this method, ASTM D 3017 shall be used to determine the moisture content of the material. The moisture gage will be standardized daily in accordance with ASTM D 3017, paragraph 7.

Acceptance of each lot of in-place material for density will be based on the percentage of material within specification limits (PWL), calculated in accordance with the computational procedure, described in Section 110, Method of Estimating Percentage of Material within Specification Limits (PWL).

If the PWL of the lot equals or exceeds 90 percent, the lot is considered acceptable. If the PWL is less than 90, rework and recompact the lot.

After recompaction, the lot will be resampled and retested in accordance with the procedures above. A new PWL will be computed based on the retest results and the lot reevaluated for acceptance. This procedure will be repeated until the PWL is 90 or greater.

NOTE TO SPECIFIER:

If the Standard Proctor (ASTM D 698) is required to determine the maximum density, it should be changed by Special Provision.

Engineer shall specify ASTM D 698 for areas designated for aircraft with gross weights of 60,000 pounds (27,200 kg) or less and ASTM D 1557 for areas designated for aircraft with gross weights greater than 60,000 pounds (27,200 kg).

152-2.12 VERIFICATION TESTING. The Engineer will verify maximum laboratory density of material placed in the field for each lot. A minimum of one test will be made for each lot of material at the site. The verification process consists of:

a. Compacting the material and determining the dry density and moisture-density in accordance with ASTM D 1557 for aircraft over 60,000 pounds or ASTM D 698 for aircraft of 60,000 pound or less (whichever test is required for initial laboratory density testing), and

b. Comparing the results with the laboratory moisture-density curves, to select the maximum density and moisture content for the material being placed.

This verification process is commonly referred to as a “one point Proctor.” If the material does not conform to existing moisture-density curves, the Engineer will establish the laboratory maximum density and moisture content for the material in accordance with ASTM D 1557 for aircraft over 60,000 pounds or ASTM D 698 for aircraft of 60,000 pounds or less (whichever test is required for initial laboratory density testing). Additional verification tests will be made, if necessary, to properly classify all materials placed in the lot.

NOTE TO SPECIFIER:

It is the intent that only one of the Pay Items from P15210 to P15215 be bid for areas requiring compaction below subgrade.

METHOD OF MEASUREMENT

152-3.1 The quantity of all classes of excavation to be paid for will be the number of cubic yards measured in its original position, computed by the method of average end areas, except as provided herein.

Where the quantity of Unclassified or Common Excavation to be excavated will be less than 500 cubic yards and measurement of such minor quantity by the above method of average end areas would be impractical, the measurement may be made by the cubic yard in the vehicle, upon approval of the Engineer. The capacity of each vehicle used for hauling the material will be determined to the nearest 1/10 cubic yard.

Boulders and surface stone of one cubic yard or more in volume will be measured individually and the volume computed from average dimensions taken in three directions.

Where slopes are undercut to provide for placing topsoil or salvaged topsoil, the quantity of undercut will not be measured for payment but will be considered incidental and the cost included as part of the Pay Items for Topsoil or Salvaged Topsoil.

Marsh excavation will be measured for payment in its original position by the average end area method, within the limits of excavation prescribed by the Plans or directed by the Engineer, to the extent that a reasonably well-defined trench of required cross section is excavated and formed, having relatively stable side slopes and the bottom of which is the bottom of the marsh or satisfactory support for the backfill and embankment. In those cases where the excavation does not result in a reasonably well defined measurable trench with relatively stable side slopes, the cross section area to be measured for payment will be based on the latter limits of the excavation prescribed by the typical section in the Plans and as staked in the field by the Engineer, and the depth between the original marsh surface and the bottom of the placed fill determined by soundings taken during excavation of the marsh or by borings taken through the completed fill. Marsh material from outside the lateral limits defined above that is excavated or displaced by the fill will not be measured for payment.

Where it is not feasible to compute volumes of the various classes of Excavation by the method of average end areas because of the erratic location of isolated deposits, these volumes may be computed by acceptable methods involving three-dimensional measurements as approved by the Engineer.

Excavation below subgrade (EBS) will be measured as Unclassified Excavation or Common Excavation, provided the Contractor requests these measurements in writing and provides the Engineer notice and access to make required measurements at the appropriate times during construction. Otherwise, excavation below subgrade will not be measured for payment.

Measurement will not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.2 No separate measurement will be made for overhaul. The limits for free haul covers the entire Work unless otherwise shown on the Plans or specified in the Special Provisions.

152-3.3 For payment specified by the cubic yard, measurement for all excavation will be computed by the average end area method. The end area is that bound by the original ground line established by field cross sections and the final theoretical pay line established by excavation cross sections shown on the Plans, subject to verification by the Engineer. After completion of all excavation operations and prior to the placing of base or subbase material, the final excavation will be verified by means of field cross sections taken randomly at intervals not exceeding 500 linear feet subject to the following conditions.

Final field cross sections will be employed if the following changes have been made:

- a. Plan width of embankments or excavations are changed by more than plus or minus 1.0 foot; or
- b. Plan elevations of embankments or excavations are changed by more than plus or minus 0.5 foot; or
- c. The Engineer determines verification is needed.

152-3.4 Measurement and payment will be made for Compaction Below Subgrade in Cut in areas where removal, manipulation, aeration, replacement, and recompaction of materials are necessary at depths greater than 9 inches below subgrade. Compaction Below Subgrade in Cut will be measured on a square yard or cubic yard basis. Measurement for payment will not exceed the quantity shown on the Plans unless ordered in writing by the Engineer. Compaction Below Subgrade in Cut will not be measured for payment in areas where excavation below subgrade, to remove unsuitable material, is measured and paid for under other Pay Items.

BASIS OF PAYMENT

152-4.1 Unclassified Excavation payment will be made at the Contract unit price per cubic yard. This price is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work specified.

152-4.2 Rock Excavation payment will be made at the Contract unit price per cubic yard. This price is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work specified.

152-4.3 Common Excavation payment will be made at the Contract unit price per cubic yard. This price is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work specified.

152-4.4 Marsh Excavation payment will be made at the Contract unit price per cubic yard. This price is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work specified.

152-4.5 Borrow Excavation payment will be made at the Contract unit price per cubic yard. This price is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work specified.

152-4.6 Payment for Compaction Below Subgrade in Cut will be made at the Contract price per square yard or per cubic yard. This price will be full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary to remove, manipulate, aerate, replace, and recompact material to the depths required.

152-4.7 Excavation below subgrade (EBS) which is required after the rough grading operations are complete in the EBS area, and which requires that the Contractor return to perform the EBS, will be paid for at a unit price determined by multiplying the Contract unit price for Common Excavation or Unclassified Excavation by three, unless the total quantity for the project exceeds 100 cubic yards. When the total quantity for EBS required, after rough grading is complete, exceeds 100 cubic yards for the entire project, either party to the Contract may request that the unit price be revised. The revision to the unit price shall be negotiated on the basis of the actual cost of the restoration, plus a negotiated allowance for profit and applicable overhead, and added to the Contract by Change Order. The quantity of EBS will be measured as determined by Engineer.

152-4.8 Erosion control, fertilizing and seeding of material disposal sites will be paid for as provided in Subsection 156-4.3, Borrow Sites and Material Disposal Sites.

152-4.9 Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15201	Unclassified Excavation, per cubic yard
Pay Item P15202	Rock Excavation, per cubic yard
Pay Item P15203	Common Excavation, per cubic yard
Pay Item P15204	Marsh Excavation, per cubic yard
Pay Item P15205	Borrow Excavation, per cubic yard
Pay Item P15210	Compaction Below Subgrade in Cut, to ___ inches, per square yard
Pay Item P15215	Compaction Below Subgrade in Cut, to ___ inches, per cubic yard

Measurement and payment will only be made for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents is included in the Pay Items contained in Schedule of Prices.

TESTING REQUIREMENTS

ASTM D 698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D 1557	Test Method for Laboratory Compaction Characteristics Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³))
ASTM D 2922	Density of Soil and Soil-Aggregate In-Place by Nuclear Methods
ASTM D 3017	Moisture Content of Soil and Soil-Aggregate In-Place by Nuclear Methods
ASTM D 3665	Standard Practice for Random Sampling of Construction Materials

SPECIFICATION P-154. SUBBASE COURSE

DESCRIPTION

154-1.1 This Work consists of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these Specifications, and in conformity with the dimensions and typical cross section shown on the Plans.

MATERIALS

154-2.1 MATERIALS. Provide subbase material consisting of hard durable particles or fragments of granular aggregates. Mix or blend this material with fine sand, clay, stone dust, or other similar binding or filler materials produced from approved sources. Produce a uniform mixture in accordance with the requirements of these Specifications capable of being compacted into a dense and stable subbase. Provide material free from vegetable matter, lumps or excessive amounts of clay, and other objectionable or foreign substances. Pit-run material may be used, provided the material meets the requirements specified.

TABLE 1. GRADATION REQUIREMENTS

<i>Sieve designation (square openings) as per ASTM C 136</i>	<i>Percentage by weight passing sieves</i>
3 inch (75.0 mm)	100
No. 10 (2.0 mm)	20-100
No. 40 (0.450 mm)	5-60
No. 200 (0.075 mm)	0-15

Material passing the No. 40 (0.450 mm) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6 when tested in accordance with ASTM D 4318.

Where frost penetration is a problem, the maximum amount of material finer than 0.02 mm in diameter shall be less than 3 percent.

154-2.2 SAMPLING AND TESTING. Furnish subbase material for preliminary testing 14 days prior to the start of construction. Initial tests on material submittals necessary to determine compliance with the specification requirements will be made by the Engineer at no expense to the Contractor.

Furnish samples of subbase material for initial tests and at intervals during construction. The Engineer will designate sampling points and intervals. The samples will be the basis of approval of specific lots of aggregates from the standpoint of the quality requirements of this Section.

In lieu of testing, the Engineer may accept certified State of Wisconsin Department of Transportation test results indicating that the subbase material meets Specification requirements.

The Engineer will take samples of subbase material to check gradation at least once daily. Sampling is in accordance with ASTM D 75, and testing will be in accordance with ASTM C 136 and C 117.

CONSTRUCTION METHODS

154-3.1 GENERAL. Place subbase course where designated on the Plans or as directed by the Engineer. Shape and thoroughly compact the material within the tolerances specified.

Mechanically stabilize granular subbases, which (due to grain sizes or shapes) are not sufficiently stable to support the construction equipment without movement. Mechanical stabilization includes addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength and to prevent deformation of the course under the traffic of the construction equipment. Addition of the binding medium to the subbase material shall not increase the soil constants of that material above the limits specified.

154-3.2 OPERATION IN PITS. Perform Work required to clear and strip pits, and handle unsuitable material encountered. Obtain subbase material from approved sources. Excavate, handle, stockpile and process material in the pits in a manner that will produce a uniform and satisfactory product.

154-3.3 PREPARING UNDERLYING COURSE. Prepare the underlying course before subbase material is placed. Do not begin placing and spreading operations until the course is checked and accepted by the Engineer.

Begin spreading the subbase along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope to protect the subgrade and to ensure proper drainage.

154-3.4 MATERIALS ACCEPTANCE IN EXISTING CONDITION. When the entire subbase material is secured in a uniform and satisfactory condition and contains approximately the required moisture, the approved material may be moved directly to the spreading equipment for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources must meet the requirements for gradation, quality, and consistency. It is the intent of this Section to secure materials that will not require further mixing. Moisture content of the material shall be approximately that required to obtain maximum density. Minor deficiency or excess of moisture may be corrected by surface sprinkling or by aeration. In such instances, some mixing or manipulation may be required, immediately preceding the rolling, to obtain the required moisture content. The final operation is blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

154-3.5 PLANT MIXING. When materials from several sources are to be blended and mixed, process subbase material in a central or travel mixing plant. Thoroughly mix subbase material, together with any blended material with the required amount of water. After the mixing is complete, transport the material and spread on the underlying course without undue loss of the moisture content.

154-3.6 MIXED IN PLACE. When materials from different sources are to be proportioned and mixed or blended in place, the relative proportions of the components of the mixture shall be as designated by the Engineer.

Deposit subbase material and spread evenly to a uniform thickness and width. Then place the binder, filler or other material and spread evenly over the first layer. Add as many layers of materials as required to obtain the specified subbase mixture.

When the required amount of materials have been placed, thoroughly mix and blend by means of graders, disks, harrows, or rotary tillers, supplemented by other suitable equipment. Continue mixing until the mixture is uniform throughout. Correct areas of segregated material by the addition of binder or filler material and by thorough remixing. Uniformly apply water prior to and during the mixing operations to maintain the material at its required moisture content. When the mixing and blending has been completed, spread the material in a uniform layer which, when compacted, will meet the requirements of thickness and typical cross section.

154-3.7 GENERAL METHODS FOR PLACING. Construct the subbase course in layers. Layers are not less than 3 inches (75 mm) nor more than 8 inches (200 mm) of compacted thickness. Place and spread material to have uniform gradation with no pockets of fine or coarse materials. Do not spread more than 2,000 square yards (1,700 square meters) in advance of the rolling unless otherwise permitted by the Engineer. Keep sprinkling within this limit. Do not place material in snow or on a soft, muddy, or frozen course.

When more than one layer is required, the construction procedure described herein applies similarly to each layer.

Exercise caution during placing and spreading to prevent the contamination of the subbase course mixture by other materials.

154-3.8 FINISHING AND COMPACTING. After spreading or mixing, thoroughly compact the subbase material by rolling. Moisten the subbase material when necessary. Furnish sufficient rollers to adequately handle the rate of placing and spreading subbase course.

Compact subbase material in-place to a field target density of at least 100 percent and a lower specification limit (L) of at least 95.5 percent of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the job site. Compact and test laboratory specimens in accordance with ASTM D 1557. The moisture content of the material at the start of compaction shall not be below nor more than 1-1/2 percentage points above the optimum moisture content, unless it is demonstrated in the field that the required density can be obtained at a lower moisture percentage.

Subbase is accepted for density on a lot basis. A lot consists of a 5,000 square yard (4180 square meter) area. The width and length of lots will be determined by the Engineer. Each lot will be divided into 8 equal sublots. Testing and acceptance will be in accordance with Subsection 154-3.9, Acceptance and Testing for Density.

NOTE TO SPECIFIER:

The Engineer shall specify ASTM D 698 for areas designated for aircraft with gross weights of 60,000 pounds (27 200 kg) or less and ASTM D 1557 for areas designated for aircraft with gross weights greater than 60,000 pounds (27 200 kg). If pavement is designed for gross aircraft weight of over 60,000 pounds or less, it should be indicated in the special provisions and the use of ASTM D 698/1557 required.

Do not roll the subbase course when the underlying course is soft or yielding or when the rolling causes undulation in the subbase. When the rolling develops irregularities that exceed 1/2 inch (12 mm) when tested with a 16-foot (4.9 m) straightedge, loosen the irregular surface and refill with similar material as used in constructing the subbase course. Repeat rolling and reworking until the specified result is achieved.

Along places inaccessible to rollers, tamp subbase material thoroughly with mechanical or hand tampers.

Moisten the subbase material during rolling, if necessary, in a manner required to obtain specified density. Do not add water in a manner or quantity that reduces the supporting strength of an underlying layer.

154-3.9 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY. Acceptance sampling and testing will be performed by the Engineer at no cost to the Contractor. The Subbase course will be accepted for density on a lot basis. Lot size, subplot size, and number of sublots will be determined as specified herein. One in-place field density test will be made for each subplot. Test locations will be determined on a random basis in accordance with statistical procedures contained in ASTM D 3665.

The percent compaction of each sampling location will be determined by dividing the in-place field density of each subplot by the average laboratory maximum density of the lot. The in-place field density will be determined in accordance with ASTM D 2922, Method B, Direct Transmission. The maximum density is the maximum density of laboratory specimens prepared from samples of material taken from the site and will be determined in accordance with ASTM D 1557. The nuclear gage will be calibrated in accordance with ASTM D 2922, Annex A1 and be operated by a technician in accordance with the requirements of the manufacturer. The operator of the nuclear gage must show evidence of training and experience in the use of this instrument. The gage will be standardized daily in accordance with ASTM D 2922, paragraph 8.

Use of ASTM D 2922 results in a wet unit weight, and when using this method, ASTM D 3017 will be used to determine the moisture content of the material. The moisture gage will be standardized daily in accordance with ASTM D 3017, paragraph 7.

Acceptance of each lot of in-place material for density will be based on the percentage of material within specification limits (PWL), calculated in accordance with the computational procedure described in Section 110, Method of Estimating Percentage of Material within Specification Limits (PWL).

If the PWL of the lot equals or exceeds 90 percent, the lot will be considered acceptable. If the PWL is less than 90, rework and recompact the lot.

After recompaction, the lot will be resampled and retested in accordance with the procedures above. A new PWL will be computed based on the retest results and the lot reevaluated for acceptance. This procedure will be repeated until the PWL is 90 or greater.

154-3.10 VERIFICATION TESTING. The Engineer will verify the maximum laboratory density of material placed in the field for each lot. A minimum of one test will be made for each lot of material at the site. The verification process consists of:

- a. Compacting the material and determining the dry density and moisture-density in accordance with ASTM D 1557 for aircraft over 60,000 pounds (or ASTM D 698 for aircraft of 60,000 pounds or less, if this test is required for initial laboratory density testing), and
- b. Comparing the results with the laboratory moisture-density curves, to select the maximum density and moisture content for the material being placed.

This verification process is commonly referred to as a "one point Proctor." If the material does not conform to existing moisture-density curves, the Engineer will establish the laboratory maximum density and moisture content for the material in accordance with ASTM D 1557 for aircraft over 60,000 pounds (or ASTM D 698 for aircraft of 60,000 pounds or less, if this test is required for initial laboratory density testing). Additional verification tests will be made, if necessary to properly classify all materials placed in the lot.

154-3.11 SURFACE TEST. The finished subbase course surface cannot vary more than 1/2 inch (12 mm) when tested with a 16-foot (4.9 m) straightedge applied parallel with, and at right angles to, the centerline. After the subbase course is completed and compacted, test for smoothness and accuracy of grade and crown. If portions are found to lack the required smoothness or failing grade or crown requirements, scarify, reshape, recompact, and otherwise manipulate until the required smoothness and accuracy are obtained.

154-3.12 THICKNESS. The Engineer will determine the thickness of the completed subbase course by depth tests or cores taken at intervals so each test will represent no more than 500 square yards (420 square meters). When the deficiency in thickness is more than 1/2 inch (12 mm), correct such areas by scarifying, adding satisfactory mixture, rolling, sprinkling, reshaping, and finishing in accordance with these Specifications. Replace the subbase material where borings are taken for test purposes at no additional cost to the Department.

NOTE TO SPECIFIER:

Thickness tests are required on FAA funded projects for acceptance if the subbase course is bid by the cubic yard in place. However, if subbase course is bid by the ton, the Engineer may eliminate thickness testing from the testing program with the approval of the FAA and BOA project manager. Thickness tests are not required on projects funded entirely by the State.

154-3.13 PROTECTION. Do not construct subbase course when the ambient temperature is below freezing or when the subgrade is frozen or wet.

154-3.14 MAINTENANCE. Maintain the finished subbase course in the accepted condition throughout its entire length by the use of standard motor graders and rollers until construction of the next course is complete.

METHOD OF MEASUREMENT

154-4.1 MEASUREMENT BY CUBIC YARD. When a Pay Item per cubic yard is provided in the Schedule of Prices, the yardage of subbase course to be paid for is the number of cubic yards of subbase course material placed, compacted, and accepted in the completed course. The quantity of subbase course material will be measured in final position based upon depth tests or cores taken as directed by the Engineer, or at the rate of 1 depth test for each 500 square yards (420 square meters) of subbase course (minimum). On individual depth measurements, thickness more than 1/2 inch (12 mm) in excess of that shown on the Plans will be considered as the specified thickness plus 1/2 inch (12 mm) in computing the yardage for payment. Subbase materials will not be included in any other excavation quantities.

154-4.2 MEASUREMENT BY TON. When a Pay Item per ton is provided in the Schedule of Prices, measurement for payment for subbase course is made by the number of tons of material placed, compacted, and accepted in accordance with this Specification. Truck scale weights as specified in Section 90, Measurement and Payment, will be used to determine the basis for tonnage.

154-4.3 MEASUREMENT FOR EROSION CONTROL. Erosion control, fertilizing and seeding of granular subbase pits and associated areas will be measured separately as provided in Subsection 156-4.3, Borrow Sites and Material Disposal Sites.

BASIS OF PAYMENT

154-5.1 Payment will be made at the Contract unit price per cubic yard or per ton, as provided in the Schedule of Prices for subbase course. This price will be full compensation for furnishing all materials; for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the Work as specified herein.

Erosion control, fertilizing and seeding of granular subbase pits and associated areas will be paid for separately as provided in Subsection 156-4.3, Borrow Sites and Material Disposal Sites.

Should excavation below subgrade be required in an area of completed granular subbase construction, restoration of the granular subbase to the plan grade and cross section in the area of EBS will be paid for at a unit price determined by multiplying the Contract unit price of the granular subbase Pay Item by three, unless the total quantity for the project exceeds 50 tons (25 cubic yards when the Pay Item is based on cubic yards). When the total quantity for subbase restoration exceeds 50 tons (25 cubic yards when the Pay Item is based on cubic yards), either party to the Contract may request revision of the unit price. The revision to the unit price shall be negotiated on the basis of the actual cost of the restoration, plus a negotiated allowance for profit and applicable overhead, and added to the Contract by Change Order. The Engineer determines quantity of restored granular subbase

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15401	Subbase Course, per ton
Pay Item P15402	Subbase Course, per cubic yard

Measurement and payment will only be made for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

NOTE TO SPECIFIER:

It is normal WBOA policy to bid Subbase Course by the ton.

TESTING REQUIREMENTS

ASTM C 136	Sieve or Screen Analysis of Fine and Coarse Aggregate
ASTM D 422	Standard Test Method for Particle-Size Analysis
ASTM D 698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (23,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D 1557	Test Method for Laboratory Compaction Characteristics Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³))
ASTM D 2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods
ASTM D 3017	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods
ASTM D 3665	Practice for Random Sampling of Construction Materials
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

SPECIFICATION P-156. TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

DESCRIPTION

156-1.1 This Work consists of temporary control measures as shown on the Plans or as ordered by the Engineer during the life of the Contract to control water pollution, soil erosion, and siltation through the use of berms, dikes, sediment basins, fiber mats, mulches, grasses, silt fences, bales, and other erosion control devices or methods.

Coordinate temporary erosion control measures contained herein with the permanent erosion control measures specified as part of this Contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include Work outside the construction limits such as borrow pit operations, equipment and material storage sites, excess excavated material disposal areas, and temporary plant sites.

Temporary Seeding consists of furnishing and placing seeding in areas designated on the Plans or as directed.

Erosion Mat includes furnishing and placing protective covering mats or soil retention mats for erosion control on prepared planting areas of slopes, ditches, channels or shorelines, at locations designated on the Plans or directed by the Engineer.

Erosion Bales consists of furnishing, placing, maintaining, and removing bales of straw or hay to form checks or dikes to control erosion, at locations designated on the Plans or as directed.

Silt Fence consists of furnishing, erecting, maintaining and removing a geotextile fabric fence and suitable support structure for retention of silt at locations designated on the Plans or as directed.

Silt Screen consists of furnishing, installing, maintaining, and removing a silt screen barrier at locations designated on the Plans or directed by the Engineer.

Cleaning Sediment Basins consists of excavation and disposal of sediment from sediment basins.

Erosion Control Mobilization consists of the Work and operations necessary for the movement of personnel, equipment and materials to the project site to permit construction of erosion control items at the stages indicated in the Contract or directed by the Engineer. The delivery of materials provided for in specific Pay Items for delivery in the Contract is not a part of this Work.

Emergency Erosion Control Mobilization consists of the Work and operations necessary for the movement of personnel, equipment, and materials to the project site to permit installation of temporary erosion control items on an emergency basis as directed by the Engineer. Temporary erosion control items include those items identified as such in the Plans or Contract or by the Engineer. Delivery of temporary erosion control materials provided for in specific Pay Items for delivery in the Contract is not a part of this Work.

MATERIALS

156-2.1 SEED. Provide seed for Temporary Seeding in accordance with Specification T-901, Seeding.

156-2.2 EROSION MAT. Erosion mat products must be prequalified by the Department before use.

Select erosion mat products from the erosion mat Product Acceptability List (PAL) developed and maintained by the Department. The PAL identifies prequalified erosion mat products by class and type. Provide a copy of the PAL "on-site". A copy of the PAL may be obtained from the Bureau of Highway Construction. A copy of the prequalification procedure for products not on the PAL may be obtained from the same office.

The required class and type of erosion mat will be shown on the Plan or will be specified by the Engineer. The Contractor may furnish any prequalified erosion mat product of the class and type shown on the Plans or specified by the Engineer.

A 12-inch (300 mm) by 12-inch (300 mm) sample of a product proposed for erosion mat use may be required by the Engineer to verify that it is prequalified. When a sample is required, provide the manufacturer's literature for the proposed product.

Apply a soil stabilizer over all Class III Type B, Type C, and Type D erosion mats unless an Erosion Control Revegetative Mat (ECRM) is specified by the Engineer as a cover. Select the soil stabilizer or ECRM from the erosion mat PAL. Jute fabric intended for use as erosion mat shall be a woven fabric of a uniform open weave of single jute yarn. The jute yarn consists of loosely twisted construction having an average twist of not less than one and one-half turns per inch (25 mm). The average size of the warp and weft yarns shall be approximately the same.

Furnish the woven fabric in rolled strips. The minimum width of the strips shall be 48 inches (1220 mm), with a tolerance of minus 1 inch (25 mm). The strip shall have 78 warp ends, plus or minus one for each 48 inches (1220 mm) of width. The fabric shall have 4 weft yarns, plus or minus two per linear yard of length. The weight of the fabric measured under average atmospheric conditions is 92 pounds per 100 square yards (50 kg/100 m²), plus or minus 10 percent. Choose a fabric that is non-toxic to vegetation.

156-2.3 STAPLES. Staples for anchoring erosion mat in place shall be U-shaped, made of No. 11 gage or larger diameter steel wire, or other approved material, have a width of 1 inch (25 mm) to 2 inches (50 mm), and a length of not less than 6 inches (150 mm) for firm soils and not less than 12 inches (300 mm) for loose soils.

156-2.4 BALES. Use straw or hay bales having dimensions shown on the Plans. Provide tightly tied bales that will remain intact during installation and throughout the project.

156-2.5 STAKES. Provide wood or metal stakes according to dimensions shown on the Plans.

156-2.6 SILT FENCE.

a. Geotextile Fabric. The geotextile fabric consists of either woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride with the following requirements: All fabric shall have the minimum strength values in the weakest principal direction. Nonwoven fabric may be needle punched, heat bonded, resin bonded, or combination.

		<i>VALUE MINIMUM REQUIREMENTS_[1]</i>	
<i>Test</i>	<i>Method</i>	<i>Silty Soils_[2]</i>	<i>Sandy Soils_[2]</i>
Grab Tensile Strength N	ASTM D 4632	450 minimum	450 minimum
Apparent Opening Size, μ m	ASTM D 4751	300 maximum	850-300
Ultra Violet Resistance Strength Retained at 500 Hours, Percent	ASTM D 4355	70 minimum	70 minimum
Permittivity, S-1	ASTM D 4491	0.14 minimum	0.14 minimum

(1) All numerical values represent minimum average roll values (i.e., the average of test results on any roll in a lot should meet or exceed the minimum values in the table).

(2) Soil determinations shall be based on that portion of a total sample passing the 4.75 mm sieve. Samples with no more than 15 percent passing the 75 μ m sieve shall be considered as sandy soils. Samples with more than 15 percent passing the 75 μ m sieve shall be considered as silty soils. The geotextile fabric shall be covered or wrapped to protect the fabric from ultraviolet radiation and from abrasion due to shipping and hauling.

b. Fence Support System. Provide a fence support system in accordance with Plan requirements.

156-2.7 SILT SCREEN.

a. Screen Fabric. The fabric shall comply with the following physical properties:

- (1) Thickness - mm.....0.38
- (2) Grab Tensile Strength - N.....530 min.
- (3) Equivalent Opening Size, μ m90 min.
- (4) Seams - All seams shall be heat sealed or sewn.
- (5) Flotation - 200 mm diameter solid expanded polystyrene log type or approved equal with a buoyancy of approximately 9 kg/300 mm of length. Polystyrene beads or chips shall not be used for flotation.
- (6) Main Load Line - 8 mm cable.
- (7) Ballast - A 6 mm chain.

CONSTRUCTION REQUIREMENTS

156-3.1 GENERAL. Deliver 25 percent of the Plan quantity of Erosion Mat, Erosion Bales, or Silt Fence to the project site prior to starting any construction operations, unless otherwise directed by the Engineer. Deliver the remaining amount required to fit actual site conditions (determined in consultation with the Engineer) in sufficient time to permit installation as provided for the specific material.

156-3.2 EROSION MAT. Select erosion mat in accordance with Subsection 156-2.2, Erosion Mat. Prior to installation, provide the Engineer with one full set of the manufacturer's literature and recommended installation procedure for each selected product. Install erosion mat in accordance with the procedure recommended by the manufacturer unless otherwise specified in the Contract or directed by the Engineer.

Cover Class III Type B, Type C and Type D erosion mats with a soil stabilizer or ECRM mat as required by Subsection 156-2.2, Erosion Mat. When a soil stabilizer is used, apply at the rate recommended by the manufacturer of the soil stabilizer unless otherwise specified.

Prior to placing the mat, remove and dispose of stones, clods, roots, sticks, excess excavation and other foreign material preventing contact of the mats with the soil.

Reseed seeded areas disturbed during erosion mat placement, in accordance with the original seeding specifications.

Following the placing of the mat, apply water to the area sufficient to moisten the seedbed to a depth of 2 inches (50 mm) and in a manner to preclude washing or erosion.

Maintain the erosion mat and repair areas damaged by erosion, traffic, fires or other causes until acceptance of the Work.

156-3.3 EROSION BALES. Place erosion bales end to end across ditches or at other areas requiring erosion control immediately after shaping of the ditches or slopes is completed. Place bales at right angles to the direction of flow. Embed and securely anchor with stakes as shown on the Plans. Excavate sumps upstream from the dikes as directed by the Engineer. Remove erosion bales after the slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely. After turf is established, dispose of bales or use as mulch. Reshape ditches, fill sumps and trenches, dispose of excess eroded material, and topsoil, fertilize and seed area disturbed by removal of bales.

156-3.4 SILT FENCE.

156-3.4.1 INSTALLATION AND REMOVAL. Erect silt fence prior to starting construction operations that might cause sedimentation or siltation at the site.

Whenever possible, construct silt fence in an arc or horseshoe shape with its ends pointing up slope. Construct silt fence to the dimensions and in accordance with the details shown on the Plans. Remove silt fences after the slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely. Materials remaining after removal shall become the property of the Contractor and shall be disposed of off the right-of-way.

156-3.4.2 INSPECTION AND MAINTENANCE. Inspect silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct deficiencies. Make a daily review of the location for silt fences and filter barriers in areas where construction activity changes the earth contour and runoff pattern, to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed.

Remove and dispose of sediment deposits when the deposit reaches approximately one half of the volume capacity of the silt fence as determined by the Engineer. Dress sediment deposits remaining in place after the silt fence is no longer required to conform with the existing grade, and topsoil, fertilize and seed the area.

156-3.5 CLEANING SEDIMENT BASINS. Clean sediment basins when sediment has accumulated to the extent that the effectiveness of the sediment basin has been impaired. Dispose of surplus material.

156-3.6 SILT SCREEN. Install silt screen in such a manner as to prevent drift shoreward or downstream. Securely attach the flotation log to the fabric in both the horizontal and vertical direction.

Attach 8 mm cable at the flotation members and extend the entire length of each section of silt screen. Seal a 6 mm cable in the lower hem for ballast.

Join connectors to the main load line and ballast chain to carry all tensile pressure. Join the fabric for its entire height with grommets and lacing rope.

Extend the silt screen from the water surface to a maximum 3 m depth.

Install anchors or stakes on both shore and stream side to maintain stability. Shore anchors shall consist of a post with deadman or approved equal. Stream anchors shall be sufficient size, type and strength to stabilize the barrier beyond the construction area.

Buoy anchors to prevent the barrier from being pulled under water. Use Danforth-type anchors in sandy bottom and heavy kedge type or mushroom anchors on mud bottoms.

Maintain the barrier throughout construction operations.

Upon completion of the Work, remove the barrier in a manner that will prevent siltation of the river.

156-3.7 EROSION CONTROL MOBILIZATIONS. Submit for approval the Erosion Control Implementation Plan (ECIP) required in Section 70, Legal Regulations and Responsibility to Public, for accomplishing temporary and permanent erosion Work. The ECIP shall stage erosion control Work to conform to the number of Erosion Control Mobilizations shown in the Schedule of Prices. No deviation from the approved staging will be allowed without the prior written approval of the Engineer. The Engineer directs Erosion Control Mobilizations. Mobilize with sufficient personnel, equipment, supplies, and incidentals within 72 hours of a written order by the Engineer. If the mobilization fails within the time period, a deduction of \$300 per calendar day will be made from money due under the Contract, for each calendar day of delay beyond such time period, except when such time period is extended by the Engineer for delays which are not the fault of and are beyond the control of the Contractor.

Erosion Control Mobilizations shall not include the work and operations necessary for normal maintenance of erosion control items, and shall not include the movement of personnel, equipment and materials to the Work site to accomplish the installation of those erosion control measures deemed necessary by the Engineer to control erosion between the stages contained in the approved Plan of operations, unless otherwise directed in writing by the Engineer.

156-3.8 EMERGENCY EROSION CONTROL MOBILIZATION. Mobilize with sufficient personnel, equipment, materials, and incidentals on the job site within 8 hours of a written order by the Engineer to install temporary erosion control measures on an emergency basis. If Failure to mobilize within the time period will result in a deduction of \$300 per calendar day from money due under the Contract, for each calendar day of delay beyond the time period, except when the time period is extended by the Engineer for delays not the fault of and beyond the control of the Contractor.

An emergency is considered to be a sudden occurrence of a serious and urgent nature, which is beyond normal maintenance of erosion control items and mobilizations included in the erosion control implementation plan, and which requires immediate mobilization and movement of necessary personnel, equipment and materials to the emergency site, followed by the immediate installation of temporary erosion control measures.

Unless otherwise directed by the Engineer, replenish stockpiles of materials delivered in compliance with the requirements of Subsection 156-3.1, General, and subsequently used to provide emergency erosion control to the totals existing in the stockpiles of such materials prior to the emergency.

NOTE TO SPECIFIER:

The intent of this section is to incorporate erosion control measures developed by WDOT Highway. This should allow the project to comply with the WDOT-DNR agreement.

156-3.9 SCHEDULE. Prior to the start of construction, submit schedules for accomplishment of temporary and permanent erosion control Work for clearing and grubbing, grading, construction, paving, and structures at watercourses in accordance with Section 70, Legal Regulations and Responsibility to Public. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of excess excavated materials. Do not start Work until the erosion control schedules and methods of operation for the applicable construction have been accepted by the Engineer.

156-3.10 AUTHORITY OF DEPARTMENT. The Department has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, to limit the surface area of erodible earth material exposed by excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams, other watercourses, lakes, ponds, or other areas of water impoundment.

156-3.11 CONSTRUCTION DETAILS. Incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Except where future construction operations will damage slopes, perform the permanent seeding and mulching and other specified slope protection Work in stages, as soon as substantial areas of exposed slopes can be made available. Use temporary erosion and pollution control measures for the following:

- a. That are needed to correct conditions that develop during construction that were not foreseen during the design stage,
- b. That are needed prior to installation of permanent control features,
- c. That are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion is likely, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, temporary erosion control measures may be required between successive construction stages.

The Engineer may limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current in

accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, implement temporary erosion control measures to the extent feasible and justified.

If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the Work as scheduled or are ordered by the Engineer, perform the Work at Contractor's own expense.

The Engineer may increase or decrease the area of erodible earth material to be exposed at one time as determined by analysis of project conditions.

Maintain Contractor installed erosion control features during the construction period.

Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into tributary natural or manmade channels.

METHOD OF MEASUREMENT

156-4.1 Temporary erosion and pollution control Work required which is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls shall be performed as scheduled or ordered by the Engineer. Completed and accepted Work will be measured as follows:

a. Temporary seeding will be measured by the pound. The quantity to be measured for payment will be the actual number of pounds of seed furnished and sown in accordance with the Contract, within the limits of such Work designated in the Contract Documents or as ordered by the Engineer.

b. Erosion Mat, Delivered, will be measured by the square yard, and the quantity measured for payment will be the number of square yards of acceptable erosion mat delivered to the Work and measured for payment under Subsection 156-4.1(c).

c. Erosion Mat, Installed, will be measured by area in square yards, and the quantity measured for payment will be the number of square yards of surface area upon which the erosion mat has been placed and accepted in accordance with the Contract. No allowance will be made for portions of the mat required to be entrenched in the soil for any end or junction slot or for required overlaps.

d. Erosion Bales, Delivered, will be measured by the unit and the quantity to be paid for will be the number of acceptable units delivered to the Work and measured for payment under Subsection 156-4.1(e).

e. Erosion Bales, Installed, completed and accepted, will be measured in place as units. Required topsoiling, fertilizing or seeding will be measured under the applicable item.

f. Silt Fence, Silty Soil, Delivered, or Silt Fence, Sandy Soil, Delivered, will be measured by the linear foot of acceptable fence delivered to the Work and measured for payment under Subsection 156-4.1(g).

g. Silt Fence, Silty Soil, Installed, or Silt Fence, Sandy Soil, Installed, completed and accepted, will be measured in place by the linear foot. Measurement will be along the base of the fence, center to center of end post, for each section of fence.

h. Silt Fence Maintenance is measured by the linear foot completed and accepted. Measurement will be along the base of the fence, end to end of the section maintained, for each time a section of fence is cleaned and repaired.

i. Silt Screen, completed and accepted, will be measured by the foot in place.

j. Cleaning Sediment Basins will be measured by the cubic yard in the vehicle.

k. Erosion Control Mobilizations, performed at the written direction of the Engineer in conformance with the foregoing applicable requirements, shall be measured as units and the quantity measured for payment will be the number of such mobilizations acceptably performed.

l. Emergency Erosion Control Mobilizations, performed at the written direction of the Engineer, shall be measured per each for mobilizations acceptably performed.

NOTE TO SPECIFIER:

The Standard Specifications were prepared assuming that borrow areas and waste areas for airport projects will be located on site and temporary and permanent erosion control for these areas will be shown on the Plans and paid for under Standard Pay Items. If this is not the case, Special Provisions should be added to the Specifications.

156-4.2 Erosion Control Work performed for protection of construction areas outside the construction limits, such as haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but will be considered as a subsidiary obligation of the Contractor with costs included in the Contract prices bid for the Pay Item to which they apply.

156-4.3 BORROW SITES AND MATERIAL DISPOSAL SITES. Pay Items for Mulching; Erosion Mat, Delivered; Erosion Mat, Installed; Erosion Bales, Delivered; Erosion Bales, Installed; Silt Fence, Silty Soil, Delivered; Silt Fence, Sandy Soil, Delivered; Silt Fence, Silty Soil, Installed; Silt Fence, Sandy Soil, Installed; Silt Fence Maintenance; Fertilizer, Type A; Fertilizer, Type B; Seeding (Mixture); and Temporary Seeding, acceptably furnished and placed on borrow sites and material disposal sites in accordance with requirements of the erosion control implementation plan and at the request of the Engineer, will be measured as provided for the separate items.

Only those Pay Items specifically named in the previous paragraph will be measured for payment.

BASIS OF PAYMENT

156-5.1 TEMPORARY SEEDING. The quantity, measured as provided above, will be paid at the Contract unit price per pound for Temporary Seeding, which price will be full compensation for furnishing material, labor, tools, equipment, and incidentals required to complete the Work in accordance with the Contract.

156-5.2 EROSION MAT, DELIVERED. The quantity, measured as provided above, will be paid for at the Contract unit price per square yard for Erosion Mat, Delivered (Class and Type), which price will be full compensation for furnishing and delivering erosion mat materials for the Work, including staples; for protection and storage on the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

156-5.3 EROSION MAT, INSTALLED. The quantity, measured as provided above, will be paid for at the Contract unit price per square yard for Erosion Mat Installed (Class and Type), which price will be full compensation for placing and anchoring the mat, including staples; for required preparation of the seeded areas; for installing end and junction slots; for repairing and reseeding damaged areas; for applying soil stabilizer; for furnishing and applying water; for disposal of all surplus and waste materials; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

ECRM mat placed over Class III, Type B, Type C, or Type D mats will be measured and paid for under the separate ECRM mat Pay Items.

156-5.4 EROSION BALES, DELIVERED. The quantity, measured as provided above, will be paid for at the Contract unit price each for Erosion Bales, Delivered, which price will be full compensation for furnishing and delivering acceptable erosion bales for the Work, including stakes; for protection and storage on the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

156-5.5 EROSION BALES, INSTALLED. The quantity, measured as provided above, will be paid for at the Contract unit price each for Erosion Bales, Installed, which price will be full compensation for placing all materials, including stakes; for anchoring the bales; for all excavation, including trenches and sumps; for removal and disposition of the bales and all waste or surplus materials, including eroded materials; for shaping and restoring ditches; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

Required topsoiling, fertilizing or seeding will be paid for under the applicable Pay Item.

156-5.6 SILT FENCE, DELIVERED. The quantity, measured as provided above, will be paid for at the Contract unit price per linear foot for Silt Fence, Silty Soil, Delivered, or for Silt Fence, Sandy Soil, Delivered, which price will be full compensation for furnishing and delivering acceptable silt fence for the Work, including all miscellaneous materials; for protection and storage on the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

156-5.7 SILT FENCE, INSTALLED. The quantity, measured as provided above will be paid for at the Contract unit price per linear foot, for Silt Fence, Silty Soil, Installed, or for Silt Fence, Sandy Soil, Installed, which price will be payment in full for erecting fence, including all excavation, placing of posts, backfilling, attaching woven wire and geotextile fabric; for removing the fence at completion of the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

156-5.8 SILT FENCE MAINTAINED. The quantity, measured as provided above, will be paid for at the Contract unit price per linear foot for Silt Fence Maintained, which price will be payment in full for required cleaning and repairing; for removing or spreading the accumulated sediment to form a surface suitable for seeding; for the replacement of silt fence and all damages caused by overloading of sediment material or ponding of water adjacent to the silt fence; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the Contract.

156-5.9 SILT SCREEN. The quantity, measured as provided above, will be paid for at the contract unit price per foot for Silt Screen, which price will be full compensation for furnishing, assembling, erecting, maintaining, and removing the silt screen barrier and for all labor, tools, equipment, and incidentals necessary to complete this item of Work.

156-5.10 CLEANING SEDIMENT BASINS. Cleaning Sediment Basins, measured as provided above, will be paid for at the Contract unit price per cubic yard, which price will be full compensation for all excavation; for disposal of surplus material; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work.

156-5.11 EROSION CONTROL MOBILIZATION. The quantity, measured as provided above, will be paid at the Contract unit price each for Erosion Control Mobilization, which price will be full compensation for the staged movement of personnel, and materials, except as otherwise provided; and for all labor, tools, equipment and incidentals necessary to complete the Work.

Erosion control items provided for in the Contract, and acceptably furnished and placed under the item of Mobilizations, Erosion Control, will be paid for separately at the Contract unit price for the item or items.

156-5.12 EMERGENCY EROSION CONTROL MOBILIZATIONS. Emergency Erosion Control Mobilizations, measured as provided above, will be paid at the Contract unit price each, which price will be full compensation for movement of personnel, equipment and materials, except as otherwise provided; and for all labor, tools, equipment and incidentals necessary to complete the movement.

Temporary erosion control measures provided for in the Contract, and acceptably furnished and placed under the Pay Item of Emergency Erosion Control Mobilizations, will be paid for separately.

156-5.13 BORROW SITES AND MATERIAL DISPOSAL SITES. Pay Items for Mulching; Erosion Mat, Delivered; Erosion Mat, Installed; Erosion Bales, Delivered; Erosion Bales, Installed; Silt Fence, Silty Soil, Delivered; Silt Fence, Sandy Soil, Delivered; Silt Fence, Silty Soil, Installed; Silt Fence, Sandy Soil, Installed; Silt Fence Maintenance; Fertilizer, Type A; Fertilizer, Type B; Seeding (Mixture); and Seeding, Temporary, acceptably furnished and placed on borrow sites and material disposal sites in accordance with requirements of the erosion control implementation plan and at the request of the Engineer, measured as provided above, will be paid for at the Contract unit price for the separate Pay Items.

Only those Pay Items specifically named will be paid for.

156-5.14 EROSION RESTORATION. Restore areas washed out or damaged, due to erosion occurring after acceptance of the permanent erosion control measures included in the Contract Documents. Restoration consists of salvaged topsoil, seeding, mulching, and erosion control measures constructed in accordance with the Specifications and applicable details, at locations determined by the Engineer.

The Engineer will stake areas to be restored prior to beginning Work. Work required to complete the Salvaged Topsoil Pay Item shall include replacing topsoil lost to erosion, discing the affected area, placing and spreading the material, and preparing the area for seeding or sodding.

Measurement for Payment for Salvaged Topsoil, Seeding, Mulching, Sodding, and the erosion control items specified in this Section will be in accordance with the provisions of the Specifications. The minimum contiguous area to be restored and measured for payment at each discrete location where erosion has occurred, through no fault of the Contractor, is 50 square yards.

Payment for the Work is made based upon the unit prices contained in the Schedule of Prices for Salvaged Topsoil, Seeding, Mulching, Sodding, and Erosion Control Pay Items. If a Pay Item is not contained in the Schedule of Prices the Work it will be considered Extra Work and the cost determined in accordance with the General Covenants and Requirements. Mobilization for each separate occurrence where remobilization for erosion control is necessary is based upon the price bid for Erosion Control Mobilization (one occurrence) or 15 percent of the total cost of the Work for restoration of the eroded area, whichever is less.

156-5.15 Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15601	Temporary Seeding, per pound
Pay Item P15602	Erosion Mat, Delivered, Class I, Type A, per square yard
Pay Item P15603	Erosion Mat, Installed, Class I, Type A, per square yard
Pay Item P15604	Erosion Mat, Delivered, Class I, Type B, per square yard
Pay Item P15605	Erosion Mat, Installed, Class I, Type B, per square yard
Pay Item P15610	Erosion Mat, Delivered, Class II, Type A, per square yard
Pay Item P15611	Erosion Mat, Installed, Class II, Type A, per square yard
Pay Item P15612	Erosion Mat, Delivered, Class II, Type B, per square yard
Pay Item P15613	Erosion Mat, Installed, Class II, Type B, per square yard
Pay Item P15614	Erosion Mat, Delivered, Class II, Type C, per square yard
Pay Item P15615	Erosion Mat, Installed, Class II, Type C, per square yard
Pay Item P15620	Erosion Mat, Delivered, Class III, Type A, per square yard
Pay Item P15621	Erosion Mat, Installed, Class III, Type A, per square yard
Pay Item P15622	Erosion Mat, Delivered, Class III, Type B, per square yard
Pay Item P15623	Erosion Mat, Installed, Class III, Type B, per square yard
Pay Item P15624	Erosion Mat, Delivered, Class III, Type C, per square yard
Pay Item P15625	Erosion Mat, Installed, Class III, Type C, per square yard

Pay Item P15626	Erosion Mat, Delivered, Class III, Type D, per square yard
Pay Item P15627	Erosion Mat, Installed, Class III, Type D, per square yard
Pay Item P15630	Erosion Bales, Delivered, per each
Pay Item P15631	Erosion Bales, Installed, per each
Pay Item P15632	Silt Fence, Silty Soil, Delivered, per lineal foot
Pay Item P15633	Silt Fence, Sandy Soil, Delivered, per lineal foot
Pay Item P15634	Silt Fence, Silty Soil, Installed, per lineal foot
Pay Item P15635	Silt Fence, Sandy Soil, Installed, per lineal foot
Pay Item P15636	Silt Fence, Maintained, per lineal foot
Pay Item P15637	Silt Screen, per lineal foot
Pay Item P15638	Cleaning Sediment Basins, per cubic yard
Pay Item P15639	Erosion Control Mobilizations, per each
Pay Item P15640	Emergency Erosion Control Mobilizations, per each

Measurement and payment will only be made for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

TESTING REQUIREMENTS

ASTM D 4355	Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D 4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	Standard Test Method for Determining Apparent Opening Size of a Geotextile

MATERIAL REQUIREMENTS

State of Wisconsin Department of Transportation Product Acceptability List (PAL).

SPECIFICATION P-158. REMOVING MISCELLANEOUS STRUCTURES

DESCRIPTION

158-1.1 DESCRIPTION. This Work consists of removing pavements, surface and base course, curb and gutter, sidewalks, masonry, guardrail, fences, utility poles, buildings, septic tanks, manholes, catch basins and inlets, storm sewer, culverts, wells, and other items that interfere with new construction, or require replacement. This Work also includes disposing of the resulting excess material, backfilling resulting excavations, abandoning appurtenant facilities, and filling or sealing as specified.

Removing Rigid Pavement consists of the removal of Portland cement concrete pavements or bases, including overlays, except that asphaltic surfaces salvaged under other Specifications in the Contract are not considered a part of Removing Rigid Pavement. Removing Rigid Pavement, Butt Joints, consists of the removal of Portland cement concrete pavements to permit construction of butt joints.

Removing Bituminous Pavement consists of the removal of all types of bituminous pavements or surfacings, including removal of bituminous overlays of existing Portland cement concrete pavements designated to remain in place. Removing Bituminous Pavement, Butt Joints, consists of removal of bituminous pavements or surfaces to permit construction of butt joints.

Site Clearance consists of removing building foundations and concrete slabs, backfilling the exposed openings and general site clearance at the locations shown on the Plans.

Abandoning Culvert Pipes consists of plugging both ends of existing culvert pipes to be left in place and abandoned.

NOTE TO SPECIFIER:

Indicate the location of pavements to be removed on the Plans. Removing Rigid or Bituminous Pavement should be measured for payment even if it is within cut or fill areas. Use Removing Bituminous Pavement and other applicable items in lieu of the highways' item of "Obliterate Old Road."

The extent and scope of items to be removed should be shown on the Plans and described in Special Provisions in sufficient detail to allow contractors to prepare bids.

Removing Concrete Sidewalk consists of the removal of concrete sidewalk, crosswalk, and steps.

CONSTRUCTION METHODS

158-2.1 BREAKING DOWN AND REMOVING. Remove, entirely within the limits shown, existing structures, including appurtenant parts and connections indicated to be removed, or interfering with the new construction.

In removing pavement, curb, gutter, sidewalk, crosswalk and similar structures, where portions of the existing structure are to be left in the surface of the finished Work, remove the structure to an existing joint, or saw and chip to a true line with a face perpendicular to the surface of the existing structure. Provide sufficient removal to provide for proper grades and connection in the new Work. Maintain drainage to prevent ponding during all stages of construction.

When constructing butt joints, remove the existing pavement or asphaltic surface to the depth shown on the Plans by grinding, planing, chipping, sawing, or other approved methods. Construct to the requirements of Subsection P-631, Milling Bituminous Pavement, for the removal of asphaltic surface by milling. Removed asphaltic surface become the property of the Contractor.

Removed bituminous pavement becomes the property of the Contractor. Dispose of bituminous pavement at locations determined by the Contractor.

Remove walls, foundations, and similar masonry structures entirely or break down within the area designated to an elevation of at least 2 feet (0.6 m) below the earth subgrade and elsewhere to 2 feet (0.6 m) below the finished slopes or natural ground.

In removing manholes, catch basins and inlets, rebuild and properly reconnect connected live sewers. Maintain satisfactory bypass service during such construction operations. Plug unused sewers with Portland cement concrete.

When a portion of the existing structure is to be retained, take care during construction operations to prevent damage to the retained portion.

Complete operations necessary for the removal of existing structures, which endanger the new construction, prior to the construction of the new work.

Do not use equipment or devices which might damage structures, facilities, or property to be preserved and retained.

In removing septic tanks, completely remove the contents of the tank first. Remove and dispose of the contents in conformance to the requirements of the Wisconsin Department of Natural Resources. Break down and remove the tank to an elevation at least 2- feet (0.6 m) below the proposed earth subgrade, or 2 feet (0.6 m) below the finished slopes or natural ground line, as required due to the location of the tank. Before backfilling, break a hole in the bottom of the remaining portion of the tank to permit drainage. Perform backfilling in accordance with the provisions of this Specification. Where a dry well is a part of the septic tank disposal system, remove it to at least 2 feet (0.6 m) below finished grade and backfill in a manner provided for the septic tank.

Dispose of material and debris resulting from removal of buildings and backfill all resulting openings. Buildings to be removed and all resulting materials shall become the property of the Contractor unless otherwise provided in the Contract.

The Department assumes no responsibility for the condition of any building at any time, and no guarantee is made or implied that any building will remain in the condition the bidder finds it at the time it is examined incident to preparing the proposal.

Procure all permits necessary for removing buildings.

Perform removal of buildings and materials in a safe manner and in compliance with the requirements of the Wisconsin Department of Workforce Development and applicable ordinances of the municipality wherein the building is located, and the Wisconsin Department of Natural Resources, particularly those regulating handling and disposal of asbestos, lead paint, and other hazardous substances. Where hazardous conditions are created incident to construction operations, furnish, erect, and maintain suitable barricades to protect and safeguard the public.

Notify public utility companies serving the building in sufficient time, prior to removal operations, to permit them to disconnect and remove their facilities.

Shut off municipal water service lines at the curb boxes and tightly plug sewer connections, or conform to the municipal ordinances or permits which may specify the manner of sealing a sewer service connection..

Unless otherwise provided on the Plans or in the Contract, include in the removal of a building the removal of that portion of its foundation, including masonry floors, to an elevation at least 2 feet (0.6 m) below the natural ground, the proposed finished earth subgrade or finished slopes, as may be necessary due to the location of the building.

Remove heating units, plumbing fixtures and similar appurtenances to the elevation of the basement floor.

Before backfilling, remove all debris not suitable for backfilling. Holes comprising at least 10 percent of the floor area shall be broken in basement floors to permit drainage.

Clear the entire premises of decomposable and combustible refuse, debris, and materials resulting from the removals and leave the premises in a neat condition upon completion of the Work.

Materials removed from building sites in conjunction with Site Clearance become the property of the Contractor. Materials may be buried on site only when noted on the Plans or in the Special Provisions. Clear the entire premises of all decomposable and combustible refuse, debris, and materials resulting from the removals, and upon completion of the Work leave the premises in a neat condition.

Backfill in accordance with the provisions of Subsection 158-2.4, Backfilling, unless otherwise provided in the Contract.

158-2.2 ABANDONING STRUCTURES. If the Contract calls for abandoning manholes, catch basins, inlets, storm sewer, or culverts, thoroughly clean them and plug the existing pipe connections with brick, concrete block masonry, or with portland cement concrete specified in Specification P-610, Structural Portland Cement Concrete. Remove walls of the structures to the required elevation.

Under the Pay Item for Abandoning Culvert Pipes, plug the ends of the pipe to be abandoned in accordance with requirements previously stated.

Abandoning wells consists of filling and sealing drilled or dug wells, which have been used for supply of water from underground sources, as specified.

Properly seal an abandoned well before performing excavation or other Contract Work that might cause the well to be lost.

Prior to the abandonment of the well, remove all drop pipes, obstructions, or debris which might interfere with or prevent the sealing or filling of the well.

Cut the casing off drilled wells at an elevation at least 2 feet (0.6 m) below the natural ground line, proposed earth subgrade or finished slopes, as necessary due to the well location. Remove and dispose of concrete masonry at the well site above the elevation of cut-off of the casing. Fill

the casing to the elevation of cut-off with concrete. Place concrete through a conductor pipe except that where practicable a dump bailer may be used. When concrete is placed under water by a conductor pipe, submerge the bottom end of the conductor pipe in the concrete at all times. Backfill excavations at the well site with suitable soils, or Granular Backfill when specified, to the finished earth grade or natural ground line.

Remove masonry or lining of dug wells to an elevation at least 7 feet (2.1m) below the natural ground line, proposed earth subgrade or finished slopes, as necessary due to the location of the well. Fill the well with concrete, bentonite chips, or with soil consisting of clay, silty clay or other impervious clayey soils. Remove substantial water in the well and place the soil in layers and firmly compact in a manner to thoroughly seal the well and to minimize settlement. Where the well is located within the limits of the proposed excavation or embankment or other proposed load bearing areas, place the soils at or near optimum moisture content, in 8-inch (200 mm) layers and so firmly compacted as to preclude settlement. Dug wells may be filled with concrete or bentonite chips to an elevation 2 feet (0.6 m) below the finished earth grade or natural ground line. Place suitable soils, or Granular Backfill when specified, above the concrete.

Bentonite chips may be used to fill drilled or dug wells within the following limitations:

- a. The well shall be in bedrock, sand, or gravel.
- b. The well shall be 4 inches (100 mm) or larger in diameter.
- c. The well shall be no more than 250 feet (75 m) deep.
- d. There shall be no more than 150 feet (45 m) of standing water in the well.
- e. If the Contractor elects to use the chips to cap a well partially filled with drilling mud or clay slurry, at least the top 20 feet (6 m) shall be bentonite chips.

The bentonite chip material shall be approved by the Department prior to use. The particles shall be irregularly shaped. Pellets or tablet shaped particles will not be accepted.

Use chips in the 0.25 inch (6 mm) to 0.40 inch (10 mm) range for sealing wells up to 4 inch (100 mm) diameter, and use chips in the 0.40 inch (10 mm) to 0.80 inch (20 mm) range for sealing wells larger than 4 inch (100 mm) diameter. Screen the chips prior to using to remove particles smaller than the smallest standard size in the selected range. Do not exceed the rate of pour into the well of one 50 lb. (22.7 kg) bag in 3 minutes to avoid bridging in the well.

Calculate the number of bags needed to fill the well from the following formula. Use of fewer bags than calculated will indicate the chips have bridged. Before the sealing is accepted, clear the point of bridging or drill out and fill the well again.

$$N = \frac{p r^2 h}{0.0195}$$

Where N - number of 22.7 kg bags required

r = well radius in meters

h = well depth in meters

0.0195 = volume of one 22.7 kg bag in cubic meters

Standing water in the well should rise to the top after filling. If it does not, pour clean water into the well through the chips until water does rise to the top.

Concrete used for filling and sealing wells shall be as specified in Specification P-610, Structural Portland Cement Concrete

Perform well abandonment in accordance with the provisions of Chapters NR111, NR112, and NR114 of the Wisconsin Administrative Code, whichever is applicable. Complete a Well Abandonment Report on forms furnished by the Wisconsin Department of Natural Resources (DNR) for each well abandoned and submit the report to the DNR.

Soils used for filling wells may be taken from the roadway excavation where suitable soils are available and when suitable soils are not so available, furnish the soils from other sources.

158-2.3 DISPOSING OF MATERIALS. Carefully remove materials designated for salvage to avoid damage and place in neat piles outside construction limits within the right-of-way at locations designated by the Engineer. Salvaged material may be used in the new construction only when and as provided in the Special Provisions or in the Specifications.

Dispose of concrete, stone, brick and other material not designated for salvage at locations provided by the Contractor.

158–2.4 BACKFILLING. Backfill trenches, holes and pits resulting from breaking down or removal of items described in this Section. Unless otherwise provided in the Contract, backfill to the elevation of the natural ground, the proposed finished earth subgrade or finished slopes, as necessary due to the location of the removed structure.

When indicated on Plans or Specifications, backfill excavations with Granular Backfill, otherwise backfill with select material from adjacent excavation.

Granular Backfill shall meet the requirements of Specification P–154, Subbase Course.

METHOD OF MEASUREMENT

158–3.1 METHOD OF MEASUREMENT. Unless otherwise provided, this Work will be measured in the original position of the structures to be removed, as follows:

Removing Rigid Pavement and Removing Bituminous Pavement will be measured by area in square yards regardless of the depth or number of courses encountered. Removing Pavement and Butt Joints will be measured by area in square yards.

Where removing curb, gutter, or curb and gutter is required in conjunction with removing rigid pavement, removal of these structures will all be classed as removing rigid pavement and will be included and measured by area in square yards of removing rigid pavement.

No deduction will be made from the volume of the various classes of Excavation (P-152) for the volume of pavement removed under the Pay Item of Removing Rigid Pavement or Removing Bituminous Pavement.

Removing curb, gutter, or curb and gutter which is separate from and not removable in conjunction with removing rigid pavement, will be measured by length in linear feet, taken along the flow line of gutter for gutter or curb and gutter, and along face of curb for curb.

Removing sidewalk will be measured by area in square yards. The area of steps will be based on the area of the horizontal projection of the steps.

Removing masonry structures will be measured by volume in cubic yards.

Removing guardrail will be measured by length in linear feet, including end sections or anchorages.

Removing fence will be measured by length in linear feet.

Removing utility poles will be measured per each.

Removing manholes, catch basins and inlets will be measured as units, including all attached parts, connections, and plugs in remaining pipes.

Removing or abandoning storm sewer and culverts will be measured per lineal foot or per lump sum for sewer lines indicated on the Plans.

Removing septic tanks will be measured per each or lump sum, and will include the removal of dry wells, which are a part of the disposal system for septic tanks.

Site Clearance will be measured as a lump sum for each specified site.

Removing wind cones, wind tees, and segmented circles will be measured as complete units per lump sum.

Removing Building will be measured as a lump sum for each specified building removed, and Removing Buildings described by parcel number will be measured as a lump sum including all buildings removed within the specific parcel.

Abandoning manholes, catch basins, inlets, culvert pipes, and wells will be measured as units per each.

Granular Backfill, when included in the Schedule of Prices, and when required for backfilling of openings caused by removal of miscellaneous structures, will be measured by Volume in cubic yards.

BASIS OF PAYMENT

158-4.1 BASIS OF PAYMENT. Payment will be made at the Contract prices for accepted quantities. The Contract unit price or lump sum price for removing or abandoning miscellaneous structures, will be payment in full for breaking down, removing, or sealing; for obtaining required work permits; for hauling and disposal of materials; for backfilling, except as otherwise provided for Granular Backfill; for furnishing required concrete masonry; and for furnishing all labor, tools, equipment and incidentals necessary to complete the Work in accordance with the requirements of the Contract.

Granular Backfill, if included in the Schedule of Prices and required for backfilling openings caused by removal or abandoning of miscellaneous structures, will be paid for at the Contract unit price per cubic yard, which price will be full compensation for such backfill complete in place as herein specified; however, when the Contract does not contain the Pay Item Granular Backfill, but Granular Backfill is specified in the Contract, such backfill material required and used will not be paid for separately but will be considered as subsidiary to and included as a part of other Work under the Contract. When Granular Backfill is not specified, but later found necessary and required, such Granular Backfill will be considered and paid for as Extra Work.

If the Contract does not include Pay Items for removing miscellaneous structures encountered in the Work, then removing such structures will be incidental and the cost included in prices bid for will be measured and paid as Common Excavation or Unclassified Excavation, except that concrete structures exceeding 1 cubic yard in volume and not otherwise specified for removal in the Contract will be paid for as Extra Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15801	Removing Rigid Pavement, per square yard
Pay Item P15802	Removing Bituminous Pavement, per square yard
Pay Item P15803	Removing Rigid Pavement, Butt Joints, per lineal foot
Pay Item P15804	Removing Bituminous Pavement, Butt Joints
Pay Item P15805	Removing Curb, per linear foot
Pay Item P15806	Removing Gutter, per linear foot
Pay Item P15807	Removing Curb and Gutter, per linear foot
Pay Item P15808	Removing Concrete Sidewalk, per square yard
Pay Item P15809	Removing Masonry, per cubic yard
Pay Item P15810	Removing Guardrail, per linear foot
Pay Item P15815	Removing Fence, per linear foot
Pay Item P15816	Removing Utility Poles, per each
Pay Item P15817	Removing Manholes, per each
Pay Item P15818	Removing Catch Basins, per each
Pay Item P15819	Removing Inlets, per each
Pay Item P15820	Removing Storm Sewer, under 30 inch diameter, per linear foot
Pay Item P15821	Removing Storm Sewer, 30 to 42 inch diameter, per linear foot
Pay Item P15822	Removing Storm Sewer, over 42 inch diameter, per linear foot
Pay Item P15823	Removing Storm Sewer, Line No. ____, per linear foot
Pay Item P15824	Removing Storm Sewer, Line No. ____, per linear foot
Pay Item P15830	Removing Culvert under 30 inch diameter, per linear foot
Pay Item P15831	Removing Culvert 30 to 42 inch diameter, per linear foot
Pay Item P15832	Removing Culvert, over 42 inch diameter, per linear foot
Pay Item P15833	Removing Culvert No. ____, per linear foot
through P15840	
Pay Item P15850	Removing Septic Tank, Site No. ____, per lump sum
Pay Item P15851	Removing Septic Tank, Site No. ____, per lump sum
Pay Item P15852	Removing Septic Tanks, per each
Pay Item P15853	Removing Building Site, No. ____, per lump sum
through P15860	
Pay Item P15861	Removing Buildings, Parcel No. _____, per lump sum
through P15865	
Pay Item P15866	Site Clearance, Site No. ____, per lump sum
through P15870	
Pay Item P15871	Removing Wind Cone, per lump sum
through P15873	
Pay Item P15874	Removing Wind Tee, per lump sum
through P15878	
Pay Item P15879	Removing Segmented Circle, per lump sum
through P15881	
Pay Item P15882	Abandon Storm Sewer, Line No. ____, per lump sum
through P15890	
Pay Item P15891	Abandon Culvert, per each

Pay Item P15892	Abandon Manhole, per each
Pay Item P15893	Abandon Catch Basin, per each
Pay Item P15894	Abandon Inlet, per each
Pay Item P15895	Abandon Well, per each
Pay Item P15896	Granular Backfill, per ton

Measurement and payment will be made only for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents will be included in the Pay Items contained in the Schedule of Prices.

NOTE TO SPECIFIER:

Coordinate the Pay Items with the Plans to indicate the location of items to be measured for payment.

SPECIFICATION P-159. SITE FINISHING**DESCRIPTION**

159-1.1 DESCRIPTION. Site Finishing, for projects where grading and drainage are a part of the Contract, consists of destruction of noxious weeds, clean out of drainage structures installed under the Contract, clean out of material deposited in existing structures as a result of construction operations, removal and disposal of all litter and debris, and final trimming and dressing required to satisfactorily restore and complete the entire construction site in reasonably close conformity with the required lines, grades, and sections shown on the Plans and Specifications.

Site Finishing on Contracts for construction of base course or surface course where grading and construction have been or will be substantially completed under other Contracts consists of the destruction of noxious weeds, the removing and disposing of litter and debris, and final shaping, finishing, trimming and dressing of shoulders, shoulder slopes and other portions of the site disturbed by the operations of the Contractor, to restore the required lines, grades and sections necessary to complete the above portions of the site, in conformity with the Plans and Specifications. On contracts where seeding operations have been completed under a previous Contract, the Contractor shall be held responsible for all damage caused by Contractor operations to the seeded areas or the vegetative covering. Replace topsoil that may have become lost or contaminated with other materials and reseed or restore areas that have become damaged by operations.

NOTE TO SPECIFIER:

Site Finishing is written similar to Highways' item Finishing Roadway. It is intended for use on most grading projects.

159-2.1 CONSTRUCTION METHODS. Trim, shape, and restore areas within grading limits to the finished cross section by means of grader and other equipment, supplemented by hand work where necessary to produce smooth surfaces and slopes, and uniform cross sections.

Remove loose and waste stones not buried, that would fail to pass a 3-inch ring, from the surface of the ground within all areas of the clearing and grubbing limits.

In turf areas, remove all loose or waste stones from topsoil that would fail to pass a 1-inch (25 mm) sieve.

Do not drag, push, or scrape material across or along the finished pavement or surface course.

Destroy all noxious weeds within construction limits by cutting or other means in a manner and at the proper time to prevent the weed plants from maturing to the bloom or flower stage. The term "noxious weeds" include Canada thistle, leafy spurge, field bindweed and such other weeds as the governing body of the county or municipality wherein the project is located declares to be noxious, in conformity with Section 66.96, Noxious Weeds, of the Wisconsin Statutes.

Prior to acceptance of the Work, where grading or structures are a part of the Contract, clean all soil, silt, or debris, and restore the waterways of all drainage installations and structures affected by the Work. Remove materials that have been deposited or lodged as a result of construction operations in waterways of other drainage installations or structures.

Trim and dress slopes of embankments and excavations to restore them to the established or specified lines and grades. Clear ditches and channels of debris and obstructions. Trim slopes to true line and grade. Remove excess earth, debris, spoil banks or other material adjacent to culverts, bridges, ditches, channels, poles, posts, and trees. Remove stones, roots, or other waste materials exposed on embankment or excavation slopes, which are liable to be loosened and dislodged. Dispose of debris from clearing and grubbing operations and leave the site in a neat, presentable condition. Fill holes and depressions appearing on the surface caused by grubbing operations with suitable material.

159-3.1 METHOD OF MEASUREMENT. Site Finishing will be measured for payment as a single complete unit of Work.

159-4.1 BASIS OF PAYMENT. Payment will be made at the Contract lump sum price for Site Finishing, which will be full compensation for furnishing materials, labor, transportation, and incidentals necessary to complete the item as specified. If the Contract does not include a separate Pay Item for Site Finishing, then the Work under this Specification shall be incidental and the cost included in Contract Pay Items for Excavation, Base Course, or Surface Course.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item P15901

Site Finishing, per lump sum

Measurement and payment will be made only for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents will be included in the Pay Items contained in the Schedule of Prices.